Value for money factors in Indian public-private partnership road projects: An exploratory approach

MohammedShakil Malek[a*] and Pradip Gundaliya[b]

[a]F. D. (Mubin) Institute of Engineering and Technology, India
[b]L D College of Engineering, India

CHRONICLE	ABSTRACT
	For the Government projects, Value for Money (VFM) is an important parameter based on which the projects are procured through Public-Private Partnership (PPP) by the public sector. The objective of this paper is to identify and evaluate perceptions of VFM factors affecting Indian road projects undertaken by PPP. Eighteen VFM factors were shortlisted through a literature survey and were validated with experienced professionals. A questionnaire survey was conducted to investigate the most important VFM factors and was grouped into three categories: financial implications, the expertise of the private sector, and contract efficiency using factor analysis. Important VFM factors were identified using the Importance Index Method. The perception was analyzed with various statistical tools. The findings from this study provide more information and understanding about VFM in an early stage, which will be helpful for decision making about PPP.

1. Introduction

The improvement of essential infrastructure is the basic need for matching the development prerequisites of a nation. Infrastructure finance requirements being a great challenge that cannot be matched by the government individually and consequently. The case for private sector support is strong for incorporate this challenge (Gunjeet Kaur et al., 2009). For the road sector, VFM usually entrusts to the competence of the public-project developed by private-sector in project management and funding (EPEC, 2011; ITF, 2018, Penyalver et al., 2019). For decision making, the required impartialness of the project impacts throughout its lifecycle is especially applicable (Penyalver et al., 2019). The strategy utilized in both quantitative and subjective evaluation needs a utilitarian data bolster which turns into the issue for acquisition avocation (Burger & Hawkesworth, 2011). A PPP acquisition methodology driven by the government could pressure reasonable collaboration with a private accomplice by developing a Special Purpose Vehicle (SPV) for the identified project. Focusing on the viability of money related control and lifecycle management, all the asset requirements and funding evaluations are worked by the two parties. VFM underpins project sponsors in working up the first rationale of whether to execute the PPP acquisition model or utilize the traditional strategies, as an essential procedure of project argumentation. The evaluation incorporates qualitative and quantitative evaluation. It is viewed as an evaluation procedure that can advance not only just from the beginning of the initial phase of the project exhibit but can additionally give powerful updates as the project advances towards post-bid or bid assessment (Henjewele et al., 2011). Evaluating VFM could recreate the seriousness that can illuminate and incite decision making in regards to a conventional and social asset, throughout the decision phase of the project. The non-success of such evaluation could prompt an adjustment in obtainment mode or abrogation. The UK Treasury's manual on evaluating VFM demonstrates that appraisal ought to be executed on the program, acquisition, and project phases across the project lifecycle (World Bank, 2014). Therefore, the VFM procedure turns a dynamic device for decision making as well as a method by which project

execution can be assessed all through its lifecycle. India ranks among the countries having the largest road networks in the world, approximately total 5.5 million kilometers. The Government of India (GOI) has realized the need for huge investments in the sector to fuel economic growth. The Government of India's Vision 2021 identified transport infrastructure as a foremost restraint to the financial development and assessed the capital funding needs to be around 82 billion USD on highway improvements by 2022 and 1.4 trillion by 2025. The investment figure has grown so much since these initial plans. For the development of such a large road sector, GOI requires a huge amount of money. So, the problem for GOI is to arrange the funding for such massive investments. During the last five years in India, the highway construction rate increased by almost 250% (12 km/day in 2014-15 to 30 km/day in 2018-19).

The private participation required in accomplishing the expected road development is about 56% (Chaturvedi, 2009). From the recent road sector experiences, it is found that there is a very low response to the private sector in road project bidding process. Though from 2005 to 2010 there was extensive use of the PPP model in road developments and a decline of the same was observed during the post-2011 period. Out of 53 road projects, only 16 projects went through a bidding process, which had private sector responses and out of which 6 projects had only single bidders (NHDP & other NHAI Projects, 2013). Specifically, the objective of this paper is to identify and analyze the VFM factors affecting Indian road projects undertaken by PPP. In the following section, the paper provides research on VFM in Indian PPP road projects. Subsequently, the execution of the study is explained in context to the research methodology applied, which is followed by discussions of the findings. The final section presents the analysis, conclusion, and limitations of this research.

2. Literature Review

2.1 Background of VFM

By inviting the private sector to handle public works projects one-of the fundamental objectives that projects are obtained by PPP is to enrich VFM. Grimsey and Lewis (2004) characterized VFM as the perfect blend of risks, entire life cycle costs, finishing time and quality to satisfy public necessities, is one of the fundamental thoughts while picking whether to accept the PPP alternative, specifically in the public segment (Boussabaine 2007; Chan et al., 2006; Cheung, 2009; Ingall 1997; Li et al., 2005b; Li, 2003). Most of the time VFM evaluation additionally requires quantitative evaluation. This normally includes contrasting the selected PPP alternative and a traditional acquisition, which has-been determined depends on Public Sector Comparator (PSC). The PSC is suggested to be utilized for most of the VFM evaluation to determine the quantitative components. Such a system could be separated adequately by utilizing diversified information from the areas of engineering funding mechanisms (Guoqian et al., 2019). PSC is the most commonly perceived tool for the public sector to identify the amount it would cost to build the asset through government funding, which is later to contrast the amount it would charge to construct it under PPP (Farrah, 2007). As an eventual outcome of conveying a project through PPP instead of conventional methods cost reserves refer to the price decrease. The cost-minimizing could be due to the innovative methods of private sector and capability which the Government may fail to achieve (Akintoye et al., 2003; Cheung, 2009; Corbett & Smith 2006; Grimsey & Lewis, 2004; Li, 2003; Li et al., 2005b; So et al., 2007). Private-sector often accomplishes high functional productivity in resource and project delivery due to having hands-on expertise, experience, innovative ideas/technology, and uninterrupted upgradations. By emphasizing the least feasible entire life cycle cost, the overall cost reduction of the project can be reached, which maximizes the profit.

Due to the participation of various stakeholders with different goals and targets, the PPP approach became more complex. Consequently, deal negotiation for PPP projects frequently needs ample proficiency contribution, a very long time, and high expenses. Therefore, it does not indicate good value to all the stakeholders incorporated in the partnership as it requires a long-time investment and high costs and, in this way, the arrangement may not appear before all else or might waver finally. In all the stages of PPP projects, judicial and further consulting charges would be incorporated as lawyers, also the charges of private sector funding, and the cost installment for sole point authority appointment. The effective high process cost may have an adverse influence on the aim of achieving the finest value (Cheung et al., 2009; Corbett & Smith, 2006; Grimsey & Lewis, 2004; Li, 2003; Li et al., 2005b; Merna & Owen, 1998; Zhang & AbouRisk 2006). Value for money can also be identified as the ideal fusion of quality and entire life cycle costs of the goods/services to meet the client's prerequisite. Nations have started to establish a particular methodology relating to VFM; however, there is a deficit in supporting data from engineering context regarding execution. The present list for making a qualitative evaluation is expansive and requires a comprehensive subdivision. By April 2018 the government of China distributed four batches of exhibit projects. An extensive number of projects didn't convey a suitable quantitative evaluation. In the majority of PPP projects, the substance of the qualitative evaluation is likewise utilized as a simple paper structure to quantify the general execution in qualitative manners (Hongyue et al., 2017).

Tsamboulas et al. (2013) anticipated an assessment structure to survey the VFM in the road segments, in light of the multi-criteria investigation. The evaluation structure references the PSC strategy and shows it straightforwardly. Jilek et al. (2018) presented another procedure, consolidating both quantitative and qualitative approaches to catch the propriety. This strategy depends on the allied determinants in the PSC structure. Liu et al. (2018) built up a quantitative decision-making strategy used in the Chinese PPP Railway project. The investigation utilized in the research separated qualitative markers for additional evaluation.

2.2 Value for Money Assessment

Morallos et al. (2009) gave investigated outputs from the department of transportation on PPP execution and suggestions to enhance VFM as an efficient apparatus as far as adequacy for coming projects. Bain (2010) and Susan (2011) both have focused on the PSC technique utilized in beginning phase evaluation in UK PFI transport projects, showing the complex associations among the concession rate and attractiveness of the project. They propose that present VFM is still difficult to anticipate. Romano et al. (2017) explore proprietorship mechanisms' proficiency by creating an examination among conventional and PPP acquirement. Ameyaw et al. (2015) examine evaluation strategies utilized in Ghana with absolutely exploratory methodologies. Zwalf and Zwalf et al. (2017) assessed the theoretical reason for moderate impartiality as one of the basic components in PSC strategy and contrasted concession price theories in the PSC technique, investigating how allied arrangements functionalized. Kweun et al. (2018) look at the VFM approach uses in US PPP roadway projects. By looking at various VFM strategies, the outcomes show that the PSC mode differed from various investigations. Jasiukevicius el al. (2018) generates a coordinated model for assessing while PPP can utilize the interests in government acquirement in both financial and social points of view. The ideal VFM assessment comprises the good quality work and potentiality of the private sector rather than the lowest tender in project bidding. VFM assessment gives a correlation between the evaluated costs of acquiring the public sector project and the evaluated cost of securing it under PPP. VFM in a PPP project has been evaluated utilizing distinctive methodologies as a part of diverse nations. Four worldwide popular ways for working out VFM are:

(1) Cost-Benefit Approach

Lots of data and postulations concerning advantages, risks, and costs are required in this approach. It contains a lot of uncertainty regarding the value of money created due to PPP. In Germany, this approach is very popular (Grimsey & Lewis 2004; Mathur, 2014, Malek, 2016).

(2) Public Sector Comparator

Broadly utilize for VFM analysis. To deliver a publicly funded service, the public sector comparator is a speculatively built indicator for evaluating VFM of the traditional financed system compared to a privately financed system. It becomes very difficult to provide a quantitative defense to involve through PPP. Evaluation of VFM through public sector comparator indicates a contrast between overall costs interrelated with a private tender analogized to the public sector comparator, assimilating for reassigned and preserved risk. It is required to perform a VFM analysis throughout the project. Special care has to be taken during a review of financial viability before open for tendering. South Africa, Japan, and the Netherlands broadly utilized the public sector comparator (Grimsey & Lewis, 2004; Mathur, 2014, Malek, 2016).

(3) UK pattern of public sector comparator

It is like a public sector comparator where assessment when an offer is done of a PPP with standard securing to recognize it or not, they speak to VFM (Grimsey & Lewis, 2004; Mathur, 2014; Malek, 2016).

(4) Moderate Tendering

It is bifurcated into two stages: the mitigation stage and the financial bid stage. In the mitigation stage, concerned entrants are selected on the premises of pre distinguished technical and financial mitigations (Grimsey & Lewis, 2004; Mathur, 2014; Malek, 2016). The majority of PPP projects in India are apportioned with this process only. As it abolishes bribery and propels transparency thus allowing better value revelation. For Indian PPP projects moderate tendering is identified as the main feasible technique by the Planning Commission of India.

3. Methodology

The main method of this research is to collect data and information by using the literature, internet, case studies, personal interactions with the experts (for validation of identified factors), and sending out questionnaires.

3.1 Sample plan

The target population consists of all the personnel connected with the implementation of the PPP road project in India i.e., private sector consisting of developers, contractors, consultants operating in India; public sector of India. The questionnaire which was carried out in this research was validated with the help of PPP experts, six experts from public sectors, eight from the private sector, and six from the researcher side were selected, who are practitioners having sound knowledge and rich experience in the Indian PPP road sector. Respondents were asked to rating their level of understanding towards the recognized factors based on a Likert scale where 1 indicates the Least Important while 5 indicates Most Important. Amongst 500 sent questionnaires, 275 replies were collected. Response ratio achieved 55 percent which is accepted and good enough for such type of survey (Li, 2005c). 84% of respondents have experience of more than 11 years in the road sector, through PPP. Only

16 % of respondents have less than 10 years' experience. 50% of respondents belong to the private sector, 26 % belong to public-sector and 24% are researchers.

3.2 Tools for Data Analysis

3.2.1 Factor Analysis (FA) for identified VFM factors

FA is utilized for recognizing a comparatively less integer of merging for factors that are then utilized to indicate interrelation between a set of numerous interrelated variables (Mathur, 2014). Kaiser-Meyer-Olkin test and Bartlett test were conducted to measure the adequacy of sampling which ought to be more noteworthy than 0.5 for an acceptable FA to continue. Bartlett's test is another sign of the quality of the relationship among variables. Values less than 0.05, of the significance level, demonstrate that factor analysis may be helpful with the data (Coakes, 2005).

3.2.2 Importance Index (II) for identified VFM factors

Respondents were asked to rate the importance of these selected VFM factors according to their experience and perception. Scaling from 'Not Important' to 'Very Important' was chosen to quantify the significance of VFM factors. The importance is presumed to be the combined result of the possibility and influence of the existence of that particular factor. Wang et al. (2000) and Thomas et al. (2003) used the index for calculating the importance of each factor as below:

$$\text{Importance Index} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{5(n_5 + n_4 + n_3 + n_2 + n_1)}$$

where, n_5, n_4, n_3, n_2, and n_1 represent no. of persons who responded and selected most important to not important in decreasing manner respectively. Index ≤ 0.50 considered as not important, > 0.5 to ≤ 0.7 as important, > 0.7 to ≤ 0.9 very important and > 0.9 as most important.

3.2.3 Analysis of Variance

To compare the mean importance rating between different categories of respondents, Analysis of Variance (ANOVA) using an F-test was carried out (Mendenhall, 1971; Levin et al., 2013). The hypothesis tested using one way ANOVA is:
The null hypothesis H_0: There is no significant difference in perception of the public sector, private sector, and researchers for choosing VFM factors for the effectiveness of PPP road projects.
The alternate hypothesis H_1: There is a significant difference in perception of the public sector, private sector, and researchers for choosing VFM factors for the effectiveness of PPP road projects.

3.2.4 Spearman's rank correlation

To look at the important positioning of the three different categories of respondents, Spearman's rank correlation method was likewise adopted. According to few researchers (Ferguson & Takane, 1989; Levin et al., 2013), this method is mostly utilized as a part of different psychological, complex environmental and socio-economic problems, to quantify the relationship amongst two ranked variables. It is useful to compare the ranks identified by different respondents. Correlation ≤ 0.4 considered as weak or no correlation, > 0.5 to ≤ 0.7 as moderate correlation, > 0.7 as strong correlation (Levin et al., 2013; Malek, 2016).

4. Analysis and Discussion

4.1 Grouping for Identified VFM factors

FA was used to the survey data to investigate the grouping that may exist among the identified factors. For checking the acceptability of sample KMO and Bartlett test was performed, which is mentioned in Table 1.

Table 1
KMO and Bartlett's Test for VFM factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.613
Bartlett's Test of Sphericity	Approx. Chi-Square	2113.478
	df	153
	Sig.	0.000

For the acceptance of FA ampleness ought to be more than 0.5, here it is 0.613, which represents the acceptability is significant. Bartlett's test is one more sign of the quality of the interrelation between factors. From Table 6 one can observe the

significance of Bartlett's sphericity test, as its significance level is lower than 0.05, which represents that a FA can be used for collecting data. With the help of the Scree plot, the factor grouping will be identified. The Scree diagram for VFM factors as mentioned in Fig. 1.
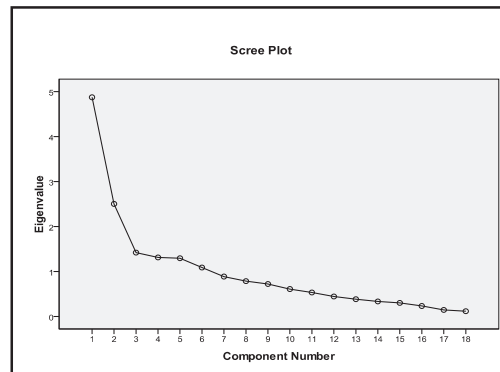

Fig. 1. Scree plot for VFM factors

Fig. 1 represents the elbow shape which indicates that the factors can be separated into three parts. Table 2 represents the rotated component matrix for three factors which represents the factor loadings. The values of factor coefficients less than 0.3 are not considered (Mathur, 2014; Malek, 2016).

Table 2
Grouping results after Rotated Factor Matrix for VFM factors

Component Name	Factor	Component 1	Component 2	Component 3
Financial Implications	Reduction in litigation, claims and conflicts	0.773		
	No cost on Government consideration	0.71		
	Extent of substantial & insubstantial advantages of the users	0.623		
	Economic tolls	0.605		
	Environmental deliberation	0.593		
	Variety of financial innovation	0.58		
	Private organization's profitability	0.567		
	Economical cost of project life cycle	0.507		
Expertise of Private sector	Private sector's expertise		0.767	
	Transferring risk		0.667	
	Output based specification		0.567	
	Quick delivery of project		0.503	
	Technological modernization of private organizations		0.414	
Efficient Contract	Better roads to Government			0.781
	Moderate tender			0.741
	Long-term nature contracts			0.56
	Systematic risk allotment			0.546
	Optimal utilization of road and effectiveness of project			0.391

Notes: Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 6 iteration.

As mentioned in Table 2 a financial implication comprises of eight factors with factor loadings varying 0.507 to 0.773, which are: reduction in litigation, claims, and conflict; no cost on Government consideration; the extent of substantial & insubstantial advantages to the users; economical tolls; environmental deliberation; a variety of financial innovations; private organization's profitability and economical cost of the project life cycle. Higher loadings are given to reduction in litigation, claims, and conflict (0.773) and no cost on Government consideration (0.710). All these factors are important from the perspective of financial implications. Reduction in litigation, claims, and conflict is one of the most critical as it will directly affect the cost and time overrun for the project. The project gets incomplete for a long time, and sometimes even canceled after the conflict arises. All the factors are affecting the financial portfolio of both private as well as the public sector. The expertise of the private sector comprises five factors with factor loadings varying from 0.414 to 0.767, which represents the private sector's expertise; transferring risk; output-based specification; quick delivery of project, and technological modernization of private organizations. Higher loadings are given to the private sector's expertise (0.767) and transferring risk (0.667). The private party can carry the project proficiently. Efficiency the project can be achieved when the private sector, with rich experience of PPP projects and the management skill required for such projects, delivers the project with the expected output specifications within approved time and cost, which is a smart alternative for the public sector to get through PPP. The correlation among the VFM and risk is that as risks are shifted to the private sector, VFM may increase until its optimum capacity, while any other risk-shifting can decrease the VFM. It is due to incompetent risk-shifting as the private sector may be not capable

to resist risk appropriately (Ismail, 2013). Early recognition of risks with organized risk management allows and motivates the PPP partners to recognize, analyze, measure, and react to the risks, also quantify to establish a risk improvement mechanism (Cheung et al., 2009). The efficient contract comprises five factors with factor loadings varying 0.391 to 0.781, which are better roads to Government; moderate tender; long-term nature contracts; systematic risk allotment, and best utilization of road and effectiveness of the project. Higher loadings are given to better roads to Government (0.781) and moderate tender (0.741). An efficient contract is very much essential for securing the best VFM in PPP road projects. For this, transparent competition is required for the selection of private-sector contractors. Because of high competition, the private sector will take required steps to enhance performance, which ultimately increases VFM achievement of the PPP project (Cheung et al., 2009). Though the competitions among private firms are significant, there was confirmation that because of cost and time constraints the tenders for PPP projects have been less competitive (Ismail, 2013). Some factors have dual loadings greater than 0.3 on more than one factor, and for such factors, the higher values are to be considered.

4.2 Ranking of important VFM factors for suitability of PPP

The importance index was calculated and ranked for all categories of the respondent as well as combined for all. Table 3 indicates the perception of the public sector, private sector, and researchers for VFM. It also represents the mean, Importance Index (I.I.), and ranking for all VFM factors group wise based on rating by the public sector, private sector, and researcher respondents.

Table 3
Group wise Rank, I.I. and ANOVA of VFM factors

Code	Factors	Public Sector		Private Sector		Researcher		Combined			
		I.I.	Rank	I.I.	Rank	I.I.	Rank	I.I.	Rank	F	Sig.
F1	Moderate tender	0.84	3	0.78	2	0.76	4	0.79	1	2.265	0.106
F2	Systematic risk allotment	0.79	5	0.78	1	0.77	3	0.78	2	0.235	0.79
F3	Optimal utilization of road and effectiveness of project	0.85	2	0.75	5	0.72	7	0.77	3	7.45	0.001
F4	Quick delivery of project	0.86	1	0.72	7	0.75	5	0.76	4	7.997	0
F5	Private sector's expertise	0.68	14	0.76	3	0.81	1	0.75	5	9.697	0
F6	Better roads to Government	0.77	7	0.75	5	0.62	16	0.72	6	11.63	0
F7	Technological modernization of private organizations	0.67	15	0.75	4	0.73	6	0.72	7	3.162	0.044
F8	Output based specification	0.73	10	0.63	11	0.79	2	0.69	8	12.36	0
F9	Private organization's profitability	0.81	4	0.66	10	0.63	12	0.69	9	14.23	0
F10	Long-term nature contracts	0.77	8	0.66	9	0.64	10	0.69	10	6.255	0.002
F11	Transferring risk	0.71	12	0.69	8	0.63	13	0.68	11	2.289	0.103
F12	Extent of substantial & insubstantial advantages of the users	0.78	6	0.59	13	0.69	8	0.66	12	18.045	0
F13	Economical cost of project life cycle	0.71	11	0.6	12	0.64	10	0.64	13	6.128	0.002
F14	Variety of financial innovation	0.62	18	0.57	14	0.66	9	0.61	14	2.736	0.067
F15	Environmental deliberation	0.65	16	0.55	15	0.62	14	0.6	15	3.851	0.022
F16	No cost on Government consideration	0.76	9	0.52	16	0.58	17	0.6	15	26.00	0
F17	Economic tolls	0.7	13	0.52	17	0.56	18	0.57	17	16.61	0
F18	Reduction in litigation, claims and conflicts	0.63	17	0.49	18	0.62	15	0.56	18	9.339	0

For the 18 VFM factors, the I.I. rating varies from 0.79 (moderate tender) down to 0.56 (reduction in litigation, claims, and conflicts). No factor I.I. came under the Most Important (>0.9) and Not Important (≤ 0.50) classifications.

4.2.1 Very Important VFM factors (I.I. from > 0.7 to ≤ 0.9)

The moderate tender (I.I. 0.79); systematic risk allotment (I.I.0.78) and optimal utilization of road and effectiveness of the project (I.I. 0.77) are the main objectives for all respondents for selection of PPP in Indian road projects. The selection of the right concessionaire is an important parameter for achieving successful VFM in PPP road projects. Technical and financial strength can also be achieved by moderate tender (Gupta, 2013). Moderate tender is expected, as in India, tendering is a mandatory process before a private party is awarded a PPP project. For achieving VFM in PP projects more competition is required, so that for securing the project private sector makes all efforts to improve their design in all aspects. This becomes a key reason for the government to select that party. On the other side, if there is no competition then the private sector doesn't make more effort to secure the project, which spoils the concept of VFM (Cheung, 2009). Systematic risk allotment is the main intention of the public sector in PPP road projects. The private sector is prominent for its expertise in managing risk using systematic resource management. It must be highlighted that risk must be recognized and allotted to them who are expert to handle it (Li, 2005a). PPP ventures empower the public sector to be conveyed in a more VFM route by utilizing the ability of private and public sectors, assets, and development to address public issues viably and productively (Hwang et al.,

2013). Some risks are complex to assign among the parties, i.e. demand risk, obsolescence risk, required to be properly divided among the parties (Ismail, 2013). The previous studies from countries like UK (Walker and Smith, 1995; Li, B., 2003; Grimsey and Lewis, 2004), South Africa (Nyagwachi, 2008) and Hong Kong (Cheung, 2009) also considered these factors as most important factors. Quick delivery of the project (I.I. 0.76); private sector's expertise (I.I. 0.75); better roads to Government (I.I. 0.72) and technological modernization of private organizations (I.I. 0.72) suggests that these factors may be associated with private-sector's expertise and innovation. PPP projects are long-run projects, it will be advisable to deliver a project on time to avoid time and cost overrun. The possibility of private-sectors to introduce their specialization well in advance in the development of road projects is considered as an important parameter of PPP by all the respondents. This output supports the previous studies of Netherlands (Koppenjan, 2005), Ireland (Gunnigan & Eaton, 2006), Hong Kong (Chan et al., 2006; Cheung, 2009; Merna and Owen, 1998; Ng and Wong, 2006), Australia and Malaysia (Ismail, 2013). But this did not support the study in the UK (Li, 2003).

4.2.2 Important VFM factors (I.I. from > 0.5 to ≤ 0.7)

The factors identified in this segments are output-based specification (I.I. 0.69); private organization's profitability (I.I. 0.69); long-term nature contracts (I.I. 0.69); transferring risk (I.I. 0.68); the extent of substantial & insubstantial advantages of the users (I.I. 0.66); the economic cost of the project life cycle (I.I. 0.64); a variety of financial innovation (I.I. 0.61); no cost on Government consideration (I.I. 0.60); environmental deliberation (I.I. 0.60); economic tolls (I.I.0.57) and reduction in litigation, claims and conflicts (I.I. 0.56). Previous studies also identify these factors as important factors for PPP projects in various countries like Hong Kong (Chan et al., 2006; Cheung, 2009; Merna & Owen, 1998; Mustufa, 1999; Ng & Wong, 2006; So et al., 2007), U.K. (Li B., 2003), Malaysia (Ismail, 2013), Netherlands (Koppenjan, 2005), Ireland (Gunnigan & Eaton, 2006) New York (Boussabaine, 2007). For monitoring, the performance of the private sector identified output-based specification can be helpful to the government. It will be helpful for the private sector also as it gives more clarity to manage the project which ultimately increases their profit (Ismail, 2013). Reduction in litigation, claims, and conflicts were perceived as the last factor. This may happen because in the last few years hardly any case was reported due to conflict parties in PPP projects.

4.3 Difference in perception rating of different category of respondents

To identify any significant difference between the perception of the public sector, private sector, and researchers one way ANOVA F – Test was carried out for each VFM factor (as mentioned in Table 3), as all factors are either very important or important. As represented in Table 3, only four out of eighteen factors were not recognized contradictorily by the public sector, private sector, and researchers. These four factors are a variety of financial innovations; transferring risk; systematic risk allotment and moderate tender. This is apparently because of the reality that the factors are progressively worried about advantages that are commonly gotten by all the three groups in PPP. These factors are straight away connected to various advantages that the public sector achieves in PPP projects along with the private sector. This proposes researchers, public and private sectors are individual parties with various belief systems and every one of these participants has its explanations behind taking part in PPP. As the public sector, in general, is progressively worried about the social advantages and likewise, the private sector is more worried about business benefits the organization would attain out of the partnership.

4.4 Correlation among respondents on the Ranking of VFM factors

The ranking of VFM factors by different categories of respondents based on the importance index is mentioned in Table 3. In the overall ranking of different VFM factors, there is also a correlation between the different categories of respondents. The spearman's rank correlation for VFM factor importance is shown in Table 4.

Table 4
Correlation among Category of Respondents on VFM factors Ranking

	Public sector	Private sector	Researcher
Public sector	1		
Private sector	0.5*	1	
Researcher	0.3*	0.7*	1

 *Spearman's rank correlation is significant at 0.05 levels

Higher similarities for VFM importance indicate that the public sector, private sector, and researchers have almost common acuity of the VFM factors in Gujarat PPP road projects and the trustworthiness of their ratings is likely to be moderate. The correlation among the public and private sector is moderate, and between public and researcher is slightly weak. But the private sector and researcher indicate a strong correlation. Since there was no difference among various categories of respondents, the classification and identification of VFM factors were done based on the combined VFM importance index. In general, the ratings of the public representatives and the researchers were relatively low in comparison to the private sector. Based on the importance of the factor index analysis, seven factors were recognized as "very important" for Gujarat road sector, which is: moderate tender; systematic risk allotment; optimal utilization of road and effectiveness of project; quick delivery of the project; private sector's expertise; technological modernization of private organization and better roads to Government, in the lowering nature of importance index. None of the factors were rated as "most important". Reduction in litigation, claims, and conflicts; low shadow tolls; environmental consideration; no cost on Government and variety of financial innovations have importance indexes between 0.5 to 0.6 which is just on the boundary of "important" range.

4.5 Validation of study

In continuation of the survey based on the importance of assessment and VFM factor identification, for validation purposes, fourteen PPP road projects (six successful and eight failure projects) executed in Gujarat were selected for actual VFM factor and their impact (Malek, 2016). The successful projects are: Vadodar-Halol (SP1), Ahmedabadad-Mehsana (SP2), Ahmedabad-Viramgam (SP3), Halol-Godhara (SP4), Bagodara-Tarapu (SP5) and Rajkot-Vadinar (SP6). The failure projects are: Suigam-Sidhada (FP1), Kishngadh-Ahmedabad (FP2), Bhuj-Nakhatrana (FP3), Bhuj-Bhachau (FP4), Deesa-Pathwada (FP5), Surat-Bardoli (FP7), Chirahi-Anjar (FP7) and Surat-Kim (FP8). The discussions held with key project personnel's regarding the effect of VFM factors in their projects. The details related to developmental, construction, and operational issues and its mitigation strategies and severity of VFM impact were documented. The main objective was to observe how far the VFM factors identified with the survey research have unfavorably influenced the respective projects. (Overall impact of all seven "very important" and eleven "important" VFM factors in each project with results of the survey analysis are given in Table 5).

Table 5
VFM assessment in Gujarat PPP road projects

Project	VFM Factors																	
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18
SP 1	@	$	$	@	$	$	$	$	$	#	$		@	$	$	$		$
SP 2	@	#	#	@	@	$	$	@	$	@	@		@	@	$	$		@
SP 3	@	@	@	@	@	$	$	$	@	#	@		@	$	@	$		@
SP 4	@	$	$	@	@	$	$	$	@	#	@		@	$	@	$		@
SP 5	@	$	$	$	$	$	$	$	$	#	@		$	$	$	$		@
SP 6	@	$	$	@	@	$	$	$	@	#	@		$	$	@	$		@
FP 1								#		#	#		#		#			#
FP 2	#							#					#		#		@	
FP 3	#							#	#		#		#		#			#
FP 4	#								#				#	#	#	#		
FP 5	#												#		#		$	
FP 6	#												#		#			
FP 7	#								#				#	#	#			
FP 8	#	#	#	#	#	#	#	#	#		#		#	#	#	#		#
	@ : High Impact;						$: Medium Impact;						# : Low Impact					

There was a fair degree of agreement of the survey-based VFM assessment and the actual VFM impact in projects examined. The majority of VFM factors, which affected the above projects, are falling under moderate tender; systematic risk allotment; optimal utilization of roads and effectiveness of project; quick delivery of the project; private sector's expertise, and technological modernization of private organization. Survey respondents evaluated "Moderate tender" as a "very important" factor, and all of the above projects except Suigam Sidhada had problems in the tendering process. This may have happened as there is very little competition in the Gujarat road sector, especially in PPP.

5. Conclusions and Implications

A questionnaire was conducted to assess the perception of the public sector, private sector, and researchers in the context of VFM in Indian road projects. All the VFM factors are separated into three factors namely financial implications, the expertise of the private sector, and efficient contract. Seven VFM factors were rectified as 'very important' in Indian road projects through PPP set up. The top five VFM factors along with their I.I. are moderate tender (0.79); systematic risk allotment (0.78); best use of road and effectiveness of the project (0.77); quick delivery of the project (0.76) and private sector's expertise (0.75) (refer Table 3). Satisfactory accordance between the public sector, private sector, and researchers for VFM importance rating of Indian PPP road projects stakeholders. The ratings of the public representatives and the researchers were relatively low in comparison to the private sector. Public sector participants have given higher significance weightage to long term nature contracts; optimal utilization of road and effectiveness of project; quick delivery of the project; the economic cost of the project life cycle; economical tolls; the extent of substantial and insubstantial advantages to the users; private organization's profitability and no cost on Government consideration, compared to the private sector and researcher participants. Both the private sector and researcher participants gave similar weightage to all these factors. Private sector respondents consider output-based specification; environmental deliberation and reduction in litigation, claims, and conflict as lower significant factors compared to public sector and researcher respondents. Researcher participants gave lower significance weightage to better roads to Government while public and private sector participants gave higher weightage. Researcher and private sector participants gave higher significance weightage to the private sector's expertise and technological modernization of private organizations compared to public sector participants. There was a fair degree of agreement of survey-based VFM assessment and the actual VFM impact in the project examined. The majority of VFM factors, which affected these projects, are falling under moderate tender; systematic risk allotment; optimal utilization of roads and effectiveness of project; quick delivery of the project; private sector's expertise, and technological modernization of private organizations. The survey result evaluated moderate tender as a very important factor, and all the projects (expect Suigam Sidhada) had problems in the tendering process.

6. Value and Future Scope of the Research

This research study has introduced VFM factors for PPP in India, especially for highway projects, which has never been introduced previously by others in India. The findings are to be useful for all professionals, both from the public and private sectors, who are either considering or as of now engaged with PPP projects. Professionals who are currently dealing with current projects can more readily see how to lead them with the goal that they can achieve VFM more effectively. It gives more confidence to take action for those specialists considering embracing or partaking with PPP projects. As a result of this more development is encouraged. The study is confined to PPP projects in the road sector in Gujarat. Future research can be extended to other sectors and other states in India. There are many perspectives in a PPP contract like dispute mechanism, good governance, quality, and technology issues, which can be further studied in detail. The same survey review used for this paper could be rehashed in different dominion, within or outside the country, to enable a national and universal correlation with the outcomes got from the Gujarat respondents.

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